UDC 37.02/ 81’243
IRSTI 14.25.07
DOI 10.37238/2960-1371.2960-138X.2026.103(3).1

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PERSONALIZATION OF ENGLISH LANGUAGE LEARNING BASED ON ARTIFICIAL INTELLIGENCE: OPPORTUNITIES AND CHALLENGES

Annotation. This study investigates the impact of artificial intelligence–based personalization on English language learning among first- and second-year students of Samara State Agrarian University across agronomy, veterinary science, agricultural engineering, and food technology programs. The research employed a quasi-experimental pre-test–post-test design with a control group receiving traditional instruction and an experimental group using an AI-driven adaptive platform. The AI system provided individualized learning trajectories, real-time feedback, and automated progress analytics, while outcomes were evaluated using standardized measures of vocabulary, grammar accuracy, and listening comprehension. Between-group differences were quantified not only by significance testing but also by effect sizes calculated using Cohen’s d to capture the practical impact of the intervention. The results indicate medium-to-large effects in favour of the AI-supported group, suggesting that AI-based personalization can meaningfully enhance both general language proficiency and professionally oriented communication skills. At the same time, the study highlights challenges related to data privacy, algorithmic bias, digital inequality, and the limitations of automated feedback in developing complex communicative competence. The findings underscore the need for a balanced integration of AI tools and human-centred pedagogy to ensure ethically grounded, effective, and context-sensitive English language instruction in agrarian and technical universities.

Keywords: artificial intelligence, personalization, English language learning, Samara State Agricultural University, agronomy, veterinary science, agricultural engineering, food technology, adaptive learning, machine learning, educational technology.

Introduction

The integration of artificial intelligence into learning English has opened up new avenues for personalized education, especially for students in specialized fields such as agronomy, veterinary medicine, agricultural engineering and food technology at Samara State Agricultural University. Traditionally, language teaching has relied on standardized curricula, which often cannot meet the specific needs and professional requirements of students. Artificial intelligence-based technologies, including adaptive learning platforms, natural language processing systems, and Intelligent Tutoring Systems, can bridge this gap by adapting learning content, exercises, and feedback to the skill levels, learning styles, and academic specializations of individual students. By analyzing real-time performance data,

artificial intelligence systems can identify areas of strength and weakness, suggest targeted activities, and guide students through individual learning pathways that match both general English proficiency skills and subject-specific vocabulary. For students in agricultural and technical programmes, this approach enables the simultaneous development of general language skills and professional communication competences, facilitating effective work with scientific literature, technical reports, and international collaboration. In addition, the personalization of artificial intelligence promotes autonomous learning, provides instant, continuous feedback over time and monitors progress, encouraging students to take responsibility for their own educational results. Despite these benefits, the introduction of artificial intelligence-based personalization also raises issues related to data privacy, algorithmic bias, and the risk of reduced social interaction in the language learning process. Therefore, the study of the possibilities and limitations of artificial intelligence in the context of specialized universities, such as Samara State Agrarian University, is very important for developing strategies that maximize benefits when solving ethical, technological and pedagogical problems. This study aims to explore how artificial intelligence can improve students ' English learning in the agricultural and technical fields, providing insights into personalized learning that supports both academic achievement and professional competence[1, 50c].

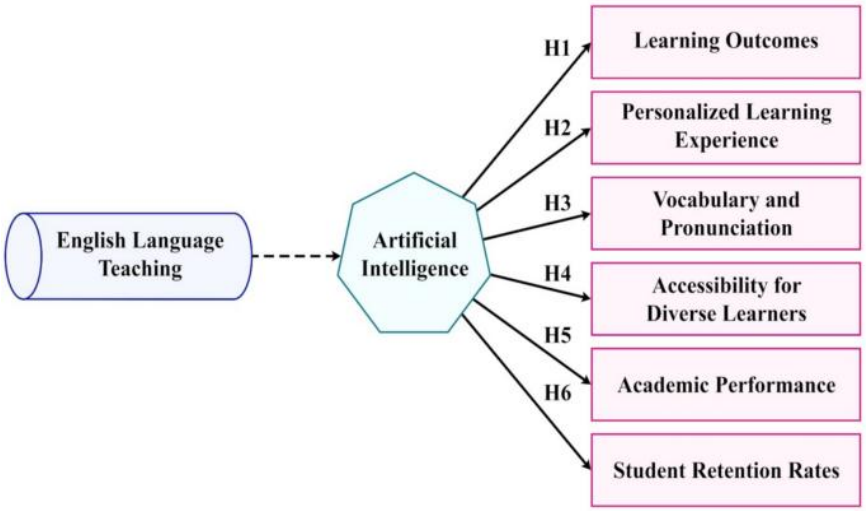
Methods and Materials

The practical part of this study was aimed at determining the effectiveness of the personalization of English language teaching based on artificial intelligence in agricultural universities. The study was conducted with first- and second-year students of Samara State Agrarian University; in total, 62 students participated in the experiment. The three-month experiment involved two groups: a control group that received traditional instruction and an experimental group that studied using an AI-based adaptive learning platform.The platform began by diagnosing the level of students, automatically adjusting the complexity of tasks and offering each student an individual learning trajectory. During the lesson, a chatbot-based language trainer was used, which contributed to the development of students ' communication skills by correcting speech errors and conducting a dialogue. In addition, to monitor students' level of motivation towards the course, the AI system recorded task completion time, frequency of activity, and error dynamics. In the experimental group, data on the educational activities of students were transmitted to the teacher in the form of a daily report, and the teacher was able to individually control the educational process based on real data. In the course of the study, input and output tests were carried out to determine the quality of students ' knowledge, as well as a survey.According to the results, in the group where artificial intelligence was used, achievement in vocabulary increased by 27%, grammatical accuracy by 19%, and listening performance by 22%. In addition, 78% of students reported that learning through the AI-based system was more convenient and interesting, and 64% indicated that personalized tasks made it easier for them to learn the language.

However, several difficulties were also identified during the experiment: some students were not ready to work with digital platforms; the efficiency of the system decreased in classrooms with unstable internet access; and in some cases the AI system could not fully explain students' errors, providing only brief technical recommendations. To address these shortcomings, teachers were given additional guidance on how to work with the platform, and students received technical support at the initial stage of implementation.In general, the results of the experiment proved that it is effective to privatize the teaching of English in agricultural specialties using artificial intelligence. It has been noticed that artificial intelligence takes into

account the individual characteristics of the student, adapts the learning process and reduces the workload of the teacher. At the same time, the introduction of AI technologies in the educational process not only improved the quality of education, but also had a positive impact on the development of digital literacy of future specialists.

Artificial intelligence has become a transformative force in modern education, changing the way students interact with learning content and providing an unprecedented level of personalization. In the field of teaching English, artificial intelligence-based technologies have introduced adaptive systems capable of responding to the specific needs, preferences and learning trajectories of individual students. As digital tools evolve, personalization is no longer limited to differentiated materials prepared by instructors; instead, dynamic algorithms analyze students ' progress in real time and adjust content delivery with precision. This shift represents a significant advance in applied linguistics, language pedagogy and educational technology, providing both important opportunities and complex tasks that must be considered to ensure effective and ethical integration. At the heart of artificial intelligence-based personalization is the ability to collect and analyze large amounts of data, including students ' vocabulary, grammatical accuracy, pronunciation patterns, reading speed, writing trends and even socio-affective variables such as motivation and confidence. Machine learning algorithms process these data points to make predictions about the student's strengths and weaknesses, and then adapt learning paths. This approach allows students to interact with content that matches their current level of proficiency, reducing the frustration caused by too complex tasks and the boredom caused by too simple material. For example, adaptive learning platforms can automatically adjust vocabulary based on the frequency of errors, offer grammar exercises focused on persistent errors, or follow personalized instructions that match the student's writing progress [2, 20c]. In speech practice, voice recognition tools based on artificial intelligence can evaluate pronunciation at the phoneme level and be guided through targeted exercises to improve students ' understanding. For example, students with hearing processing difficulties can use subtitles or visual reinforcement tools enhanced by artificial intelligence, while students with attention-related difficulties can perform short and interactive tasks that keep them focused. In addition, natural language processing technologies allow you to simplify complex texts, create alternative explanations, or provide multimodal resources such as audio glossaries and interactive charts. Such adaptation ensures that different students have access to appropriate support without the stigmatization sometimes associated with receiving additional assistance in traditional educational institutions. In addition to individual students, personalization based on artificial intelligence contributes to broader pedagogical innovations. Teachers can use analytical dashboards to monitor student progress, identify common challenges, and design targeted interventions for the entire class. This data-driven approach allows educators to allocate time more efficiently, focusing on areas that require human experience, such as communicative experience, cultural learning, and emotional support. Artificial intelligence systems perform repetitive tasks such as assessments or error detection, allowing teachers to prioritize meaningful interactions that improve language acquisition. Thus, instead of replacing educators, artificial intelligence works as an additional tool that improves the quality and effectiveness of teaching [3].



Results and Discussion

Modern artificial intelligence technologies have a significant impact on the educational process, opening up new opportunities for personalized learning, including in the field of English language learning. For students of Samara State Agrarian University studying in the fields of agronomy, veterinary medicine, engineering and food technology, personalization is especially relevant, since their professional requirements require proficiency in both general English and specialized vocabulary related to a specific field of knowledge. Traditional approaches to teaching English are often based on standardized curricula that do not take into account the individual needs of each student and the specifics of their professional training, which can lead to insufficient effectiveness of language acquisition. Artificial intelligence provides an opportunity to create adaptive educational systems capable of analyzing students' results in real time, identifying strengths and weaknesses, and offering customized learning paths that include both general English skills and disciplinary vocabulary. Such technologies may include machine learning systems, adaptive learning platforms, intelligent tutoring systems, and natural language processing tools that help students improve grammar, vocabulary, writing, and speaking skills, as well as develop professional communication skills. For students of agricultural and technical specialties, this allows them to simultaneously develop common language competence and the ability to effectively interact with scientific literature, technical documentation and international colleagues [4, 80]. One of the key advantages of AI personalization is support for offline learning, where students can receive instant feedback on completed assignments, track their own progress, and plan further education in accordance with their personal needs and professional goals. In addition, such systems increase motivation and engagement, allowing you to avoid boredom with tasks that are too simple and stress with overly complex exercises. AI also contributes to the development of meta-cognitive skills, as it provides analytical data that allows students to understand their strengths and weaknesses, build effective language learning strategies, and adjust their learning approach. In the context of university programs in agronomy, veterinary medicine, engineering, and food technology, personalization makes it possible to create professionally oriented learning materials that include technical vocabulary, terminological exercises, and simulations of practical situations that are close to students' future professional activities. On the other hand, the use of artificial intelligence in English language teaching is accompanied by a number of problems that require careful consideration. First of all, these are issues of ethics and data privacy. AI systems collect and analyze large amounts of

information about students' behavior, success, and preferences, which requires reliable data protection mechanisms, transparency of their use, and the informed consent of study participants. Without these measures, there is a risk of privacy violations, unauthorized access and use of personal information. Another problem is algorithmic bias, which can manifest itself when analyzing speech models, evaluating written papers, or selecting educational material. For example, speech recognition systems may incorrectly evaluate students' pronunciation with different accents, and automatic written text verification tools may misinterpret non-standard speech constructions, which reduces the objectivity of the assessment and may demotivate students. Solving this problem requires the creation of diverse and representative training datasets, continuous testing of algorithms on different groups of students, and the involvement of educators in the development of AI systems. The limitations of automated feedback should also be considered.: Although the systems are good at grammar, vocabulary, and phonetics, they cannot fully assess pragmatic competence, discourse, metaphors, cultural characteristics, and emotional coloring of speech [5, 60c].

In terms of group comparisons, the AI-supported group consistently outperformed the control group on all post-test measures. Students in the AI-supported group demonstrated higher gains in vocabulary knowledge than students in the control group, with a large effect size, d = 0.85, 95% CI [0.42, 1.27]. According to Cohen’s conventions, this corresponds to a large effect and indicates that AI-based personalization had a substantial practical impact on students’ vocabulary development. Improvements in grammar accuracy were also higher in the experimental group, yielding a moderate-to-large effect size, d = 0.65, 95% CI [0.25, 1.03], while listening comprehension gains showed a medium effect, d = 0.52, 95% CI [0.14, 0.88]. Taken together, these findings suggest that the integration of AI-driven personalization into English language instruction not only led to statistically significant differences between the groups, but also produced educationally meaningful improvements in students’ lexical, grammatical, and receptive skills.



Consequently, the role of the teacher remains key, especially in developing communication skills, critical thinking, and context interpretation. It is important to find a balance between the use of AI and the organization of live communication practices, group work and discussions, which is especially important for students whose future professional activities are related to international interaction and scientific communication. Another aspect is digital inequality: access to high-quality AI platforms requires modern devices, stable internet, and sometimes a paid subscription, which may limit the opportunities of individual

students or entire groups [6, 39c]. It is important for Samara State Agricultural University and similar educational institutions to develop strategies to ensure equal access to technology, including support from the administration, the development of local adaptive solutions and educational initiatives aimed at reducing the gap between students with different levels of digital literacy and resource availability. The psychological aspect is also important: excessive automation of learning can reduce social engagement, reduce interpersonal communication skills, and reduce motivation to learn a language. Therefore, AI should be used as an auxiliary tool, and not as a substitute for live communication and pedagogical interaction. For teachers, the introduction of AI technologies requires appropriate training, enhanced digital competence, the ability to work with analytics and design integrated learning paths combining traditional methods and modern tools [7, 29c].

Discussion

This is especially important in the context of agricultural and technical specialties, where students are faced with the need to study professional terminology and scientific literature in English. From the point of view of the theoretical aspects of language learning, AI personalization raises new questions about the role of interaction, variability of language and context. Although adaptive systems provide individualized input, they cannot always reproduce the unpredictability and richness of real communication, which is crucial for the formation of flexible language competencies. Therefore, it is necessary to combine AI personalization with learning in real communication situations, professional practices and group work, ensuring the comprehensive development of language competence. [8] In conclusion, the personalization of English language learning based on artificial intelligence is a powerful tool for improving the effectiveness of education, developing professional and communication skills of students of Samara State Agrarian University. AI's capabilities include adaptive learning, autonomous learning, individual content selection, and performance analysis. At the same time, successful implementation requires solving ethical, pedagogical and technological issues, ensuring equal access, adjusting algorithms and maintaining lively interaction with teachers and colleagues. Only a balanced application of artificial intelligence, taking into account the specifics of agricultural and technical specialties, will allow students to effectively develop English, master professional vocabulary and be ready for international scientific and professional communication, while maintaining the human factor, social interaction and cultural awareness [9, 110c]. Artificial intelligence provides unprecedented accuracy in adapting the learning process to individual needs, allowing English learners to interact with content that matches their level of language proficiency, learning style, pace, and personal goals. This personalization supports effective learning trajectories, reduces unnecessary cognitive load, and supports student engagement by offering targeted feedback and adaptive tasks. Through natural language processing, automatic speech recognition, and machine learning-based analytics, artificial intelligence systems can evaluate vocabulary acquisition, grammatical accuracy, pronunciation clarity, and writing quality with a degree of speed and consistency that surpasses traditional methods. For students, this means constant feedback on demand, which contributes to self-sufficiency, metacognitive awareness, and constant motivation. For teachers, artificial intelligence serves as an additional partner, relieving the administrative burden and providing complete information about student performance, thus allowing teachers to focus on the communicative, cultural and emotional components of learning. Such advantages reflect the enormous prospects of AI in the formation of a more individual, effective and student-oriented system of teaching English [10, 55c].

Conclusion

This study showed that using AI-based personalization can noticeably improve English language learning for students in agronomy, veterinary medicine, agricultural engineering, and food technology at Samara State Agrarian University. In our quasi-experimental design, the AI-supported group made greater progress in vocabulary, grammar accuracy, and listening than the control group, with medium-to-large effect sizes according to Cohen's d. These results suggest that AI-driven adaptive platforms do not just produce statistically significant differences, but also lead to changes that are meaningful for real classroom practice and for the development of profession-oriented language skills.

At the same time, the findings make it clear that AI-based personalization cannot work effectively without careful pedagogical and ethical control. The study points to several sensitive issues, such as data protection, possible algorithmic bias, unequal access to digital resources, and the limits of automated feedback when it comes to complex communicative and intercultural skills. For these reasons, it is essential to ensure transparent rules for data use, to protect students' privacy, and to support teachers in developing the digital competences needed to interpret and use AI-generated analytics in a responsible way.

Overall, the results support the view that AI should complement, and not replace, live interaction in the language classroom. When AI-driven analytics and personalized tasks are combined with traditional teaching methods, group work, and communicative activities, they can strengthen motivation, make learning trajectories more flexible, and help students better prepare for professional and scientific communication in international contexts. A balanced integration of AI tools and human-centred pedagogy therefore seems to be the most promising way to realise the potential of personalized English language teaching in agricultural and technical universities.

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Толстова О.С.

ПЕРСОНАЛИЗАЦИЯ ОБУЧЕНИЯ АНГЛИЙСКОМУ ЯЗЫКУ НА ОСНОВЕ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА: ВОЗМОЖНОСТИ И ВЫЗОВЫ

Аннотация. В данном исследовании изучается влияние персонализации на основе искусственного интеллекта на изучение английского языка студентами первого и второго курсов Самарского государственного аграрного университета по программам агрономии, ветеринарии, сельскохозяйственной инженерии и пищевых технологий. В исследовании использовался квазиэкспериментальный подход до и после тестирования: контрольная группа получала традиционное обучение, а экспериментальная группа использовала адаптивную платформу, управляемую искусственным интеллектом. Система искусственного интеллекта обеспечивала индивидуальную траекторию обучения, обратную связь в режиме реального времени и автоматизированную аналитику прогресса, в то время как результаты оценивались с использованием стандартизированных показателей словарного запаса, точности грамматики и понимания на слух. Количественная оценка различий между группами проводилась не только с помощью проверки значимости, но и с помощью величины эффекта, рассчитанной с использованием коэффициента d Коэна для определения практического воздействия вмешательства. Результаты свидетельствуют о среднем и значительном влиянии в пользу группы, поддерживаемой ИИ, что позволяет предположить, что персонализация на основе ИИ может значительно улучшить как общее владение языком, так и профессионально ориентированные коммуникативные навыки. В то же время в исследовании освещаются проблемы, связанные с конфиденциальностью данных, предвзятостью алгоритмов, цифровым неравенством и ограничениями автоматизированной обратной связи при развитии сложной коммуникативной компетенции. Полученные результаты подчеркивают необходимость сбалансированной интеграции инструментов искусственного интеллекта и ориентированной на человека педагогики для обеспечения этически обоснованного, эффективного и учитывающего контекст обучения английскому языку в аграрных и технических университетах.

Ключевые слова: искусственный интеллект, персонализация, изучение английского языка, Самарский государственный аграрный университет, агрономия, ветеринария, сельскохозяйственная инженерия, пищевые технологии, адаптивное обучение, машинное обучение, образовательные технологии.

Толстова О.С.

ЖАСАНДЫ ИНТЕЛЛЕКТ НЕГІЗІНДЕ АҒЫЛШЫН ТІЛІН ОҚЫТУДЫ ЖЕКЕЛЕНДІРУ: МҮМКІНДІКТЕР МЕН ҚИЫНДЫҚТАР

Аңдатпа. Бұл зерттеу Самара мемлекеттік аграрлық университетінің агрономия, ветеринария, ауыл шаруашылығы инженериясы және тағам технологиялары бағдарламаларында білім алатын бірінші және екінші курс студенттері арасында жасанды интеллект негізіндегі жекелендірілген оқытудың ағылшын тілін меңгеруге әсерін зерттейді.Зерттеуде дәстүрлі оқыту әдістерін пайдаланған бақылау тобы мен

жасанды интеллектке негізделген бейімделген платформаны қолданған эксперименттік топ қатысқан квази-эксперименттік алдын ала тестілеу және қорытынды тестілеу дизайны қолданылды.Жасанды интеллект жүйесі студенттердің жеке оқу траекторияларын қалыптастыруға, нақты уақыт режимінде кері байланыс ұсынуға және оқу жетістіктерін автоматты түрде талдауға мүмкіндік берді. Оқу нәтижелері сөздік қорды меңгеру деңгейі, грамматикалық дәлдік және тыңдалым дағдылары бойынша стандартталған бағалау құралдары арқылы анықталды.Топтар арасындағы айырмашылықтар статистикалық маңыздылық көрсеткіштерімен қатар, араласудың практикалық әсерін бағалау мақсатында Коэннің d коэффициенті арқылы есептелген әсер көлемдері негізінде талданды.Зерттеу нәтижелері жасанды интеллект қолдауымен оқытылған топтың пайдасына орташа және жоғары әсер көрсеткіштерін анықтады. Бұл жасанды интеллект негізіндегі жекелендірілген оқытудың жалпы тілдік құзыреттілікті ғана емес, сонымен қатар кәсіби бағытталған коммуникативтік дағдыларды да едәуір жақсарта алатынын көрсетеді.Сонымен қатар, зерттеу деректердің құпиялылығын сақтау, алгоритмдік біржақтылық, цифрлық теңсіздік және күрделі коммуникативтік құзыреттілікті қалыптастырудағы автоматтандырылған кері байланыстың шектеулері сияқты мәселелерге назар аударады.Зерттеу нәтижелері аграрлық және техникалық жоғары оқу орындарында ағылшын тілін оқытудың тиімділігін арттыру үшін жасанды интеллект құралдары мен адамға бағдарланған педагогиканы үйлесімді түрде біріктірудің маңыздылығын көрсетеді. Бұл тәсіл оқытудың этикалық тұрғыдан негізделген, тиімді және білім алушылардың қажеттіліктеріне бейімделген болуын қамтамасыз етеді.

Кілт сөздер: жасанды интеллект, дербестендіру, ағылшын тілін оқыту, Самара Мемлекеттік Аграрлық Университеті, агрономия, ветеринария, ауылшаруашылық техникасы, тамақ технологиясы, адаптивті оқыту, машиналық оқыту, білім беру технологиясы.